



BULLETIN

OFFICE OF NAVAL RESEARCH EUROPEAN OFFICE Box 39, FPO New York 09510-0700 Phone (AV)235-4131 (Comm) 409-4131

MASB 28-89

PILOT-A Radar For Covert Operations

Background. Radar is an indispensable sensor for naval operations at night and under conditions of poor visibility. However, conventional pulsed radar, has a distinct disadvantage: it can easily be detected at long ranges. Electronic support measures (ESM) can detect and identify transmission of radar pulses with high peak power. Similarly, platforms operating with pulsed radars are threatened by antiradiation missiles (ARMs) that home in on these high-peak-power transmissions.

One way to circumvent this problem is to use a low-power, continuous wave (CW) radar. Because the ESM range is determined by the radar's peak power, this CW radar reverses the relationship between ESM- and radar-detection range. In the case of CW radar this means that the ESM range is significantly smaller than the radar's detection range. Therefore, this type of radar enables the operator "to see without being seen." Using this principle, Philips has developed PILOT, the unique naval radar that is virtually undetectable by ESM and ARMs.

PILOT'S performance equals that of a conventional pulsed navigation radar and offers all advantages of radar-aided operation during radar silence conditions. Pilot has been tested extensively, both in the laboratory and on a land-based tower, as well as during sea trials.

Description.

- Low probability of intercept (LPI)
- Suitable for surface ships and submarines
- Low-power transmitter
- Solid-state transceiver
- High dynamic range
- Smooth integration with existing pulsed radar system
- Easy to maintain

Configurations.

Display:

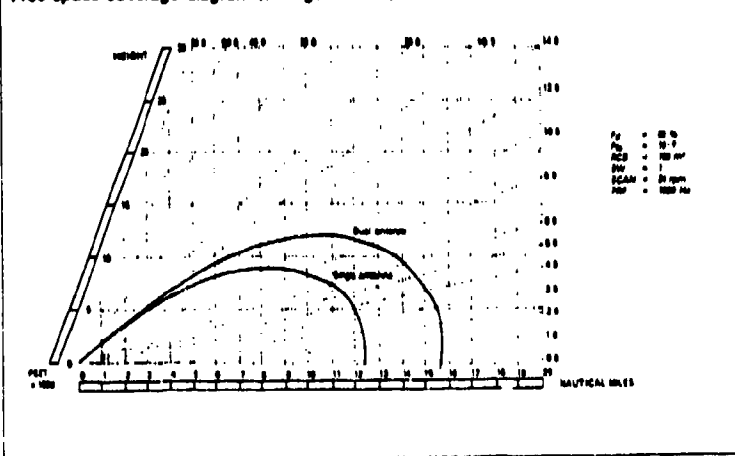
DTIC QUALITY INSPECTED 2

This video output of the PILOT processor unit meets the input requirements of most display systems. These systems may be conventional PPI-type displays, rasterscan daylight displays, with or without ARPA functions. A small control panel, connected to the processor unit, should be installed near the display. This control panel is used for range selection and STC setting.

Antenna:

Configuration 1. PILOT is delivered complete, including antenna, pedestal, transceiver box, processor unit, and control panel. In this configuration, it is possible to fit a dual antenna, which will improve the range performance by 25 percent (recommended for ships). The transceiver box is mounted on the back of the antenna.

Free space coverage diagram (configuration 1)



Configuration 2. PILOT replaces an existing radar system of which the antenna is retained. The antenna must have a voltage standing wave ratio (VSWR) better than 1:1.2 over a 50-MHz bandwidth. Range performance depends of the characteristics of the antenna.

Configuration 3. The PILOT transceiver box and processor unit can be installed as an add-on to an existing navigation radar. This gives the user the choice between conventional pulsed radar and quiet frequency modulated continuous waves (FMCW) radar. The transceiver box is equipped with a waveguide switch. The antenna characteristics must meet the configuration 2 requirements.

Dist	Avail and/or Special
A-1	

93-23927



93 10 8 061